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EXAMINER	
GRAHAM, ANDREW R	

ART UNIT	PAPER NUMBER
2644	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/320,349	WEDGE, DONALD SCOTT
	Examiner	Art Unit
	Andrew Graham	2644

9/13

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 May 0999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings submitted on May 26, 1999 remain objected to for the reasons listed on the Notice of Draftsperson's Drawing Review, form PTO-948, a copy of which was mailed to the applicant on June 19, 2003.

Allowable Subject Matter

2. The indicated allowability of claims 18-22, and potentially 6, 10, 11, 13, and 17, is withdrawn in view of the newly discovered reference(s) to Slater (USPN 4941187) and Elko (USPN 6041127). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. In the previous office action, Claim 1 was rejected under 35 U.S.C. 112 for failing to particularly point out and distinctly claim the subject matter which applicant regarded as the invention. This rejection was made because the word 'sufficient' rendered the claim indefinite because it didn't provide a specific amount or quantity and was unclear to what degree of limitation the word pertained to.

In the applicant's most recent amendment, dated July 19, 2004, the applicant removed this word from Claim 1, as well as Claim 7. Accordingly, the previous rejection under 35 U.S.C. 112 is withdrawn.

4. However, the word "sufficient" is included in Claims 6 and 14 in the present version of the claims. Accordingly, **Claims 6 and 14** are rejected under 35 U.S.C. 113 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Again, the word "sufficient" renders these claims indefinite because it doesn't provide a specific amount or quantity and is unclear to what degree of limitation the word pertains to.

5. **Claim 10** recites the limitation "the third right summer" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 10-11 and 24-26** are rejected under 35 U.S.C. 102(b) as being anticipated by Kinoshita et al (USPN 5734724, hereafter, "Kinoshita").

Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various input audio channels are controlled in regards to their perceived spatial position.

Regarding **Claim 10**, Kinoshita teaches:

a first audio input configured to receive a first monaural audio signal (e.g., C_1 from (MC) of (TM-1), col. 5, lines 29-32 and col. 7, lines 5-19 of Kinoshita);

a second audio input configured to receive a second monaural audio signal (e.g., C_2 from (MC) of (TM-2), col. 5, lines 29-32 and col. 7, lines 5-19 of Kinoshita);

a first differentiation block (e.g., 3-1, 4-1L & 4-1R collectively, col. 7, lines 22-34 of Kinoshita)

a second differentiation block (e.g., 3-2, 4-2L & 4-2R collectively, col. 7, lines 22-34 of Kinoshita)

a first channel summer (5L; col. 6, lines 61-64 of Kinoshita)

a second channel summer (5R; col. 6, lines 65-67 of Kinoshita)

the first monaural signal is provided from a radio receiver (col. 8, lines 39-44 of Kinoshita)

a microphone (MC) coupled to the communication system (e.g., at TM-3, col. 7, lines 5-7) and,

the microphone (MC)producing a third audio signal coupled to a third differentiation block (e.g., 3-3, 4-3L, and 4-3R, collectively)(col. 6, lines 8-20),

the third differentiation block providing a third differentiation cue (e.g. ILD; col. 6, lines 20-36) to the third audio signal to produce a third left channel (output of 4-3L) and a third right channel (output of third left channel 4-3R), the third left channel being coupled to the left channel summer (5L) and the third right channel being coupled to the third right channel summer(5R) (Figure 6, col. 6, lines 57-67).

Regarding **Claim 11**, please refer above to the rejection of the similar limitations of Claim 10.

Kinoshita in view of Techniques further teaches:

a detector (23B) coupled to the radio receiver (lines 40), the detector (23B) coupled to a switch (SW-2) disposed between the second audio input (C_2) and the left channel summer (5L) and the right channel summer (5R), the switch (SW-2) being responsive to a detection signal (output of 23B) produced by the detector (23B) and opening when a signal is detected (col. 9, lines 5-48; col. 27, lines 30-38).

Regarding **Claim 24**, Kinoshita specifies:

A method for listening to simultaneous audio signals (col. 7, lines 1-4 and 29-36), the method comprising:

receiving a first audio signal (e.g. on C_1)(col. 5, lines 46-52);

adding only a first differentiation cue (col. 7, lines 22-29) in the form of a differential time delay (col. 6, lines 44-49) to the

first audio signal to produce a right first audio signal and a left first audio signal (output of 4-1L,4-1R)(col. 6, lines 11-20);

receiving a second audio signal (e.g., on C_2)(col. 5, lines 48-52);

producing a right second audio signal and a left second audio signal from said second audio signal (output of 4-2L,4-2R)(col. 6, lines 11-20);

providing the right first audio signal and right second audio signal (added by 5R, col. 6, lines 65-67) to a right audio transducer (53R, col. 7, lines 22-42); and

providing the left first audio signal and the left second audio signal (added by 5L, col. 6, lines 61-64) to a left audio transducer (53R, col. 7, lines 22-42);

wherein said first differentiation cue provides differentiation to allow a listener to more easily distinguish said first and second audio signals than without said differentiation cue (col. 1, lines 26-42, col. 7, lines 14-22).

Regarding **Claim 25**, please refer above to the rejection of the similar limitations of Claim 24, noting that Kinoshita discloses an alternate sound image control parameter of an acoustic transfer function, which in terms of sinusoidal audio signals, relates the frequency, amplitude, and phase of the signal (col. 6, lines 50-56). Aspect of acoustic transfer function therefore read on "a differential frequency gain".

Regarding **Claim 26**, please refer above to the rejection of the similar limitations of Claim 24, noting that Kinoshita teaches that the communication channels may be radio channels, which reads on "in the form of a radio broadcast" and "in the form of a second radio broadcast" (col. 8, lines 39-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claim 1, 2, 6-9, 14, 15, and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita, as applied above to Claims 24-26, in further view of Begault, D.R. et al "Techniques and Applications for Binaural Sound Manipulation in Human-Machine Interfaces", hereafter referred to as "Techniques".

Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various input audio channels are controlled in regards to their perceived spatial position.

Regarding Claim 1, Kinoshita specifies:

A method for listening to simultaneous audio signals (col. 7, lines 1-4 and 29-36), the method comprising:

receiving a first audio signal (e.g. on C_1)(col. 5, lines 46-52);

adding only a first differentiation cue (col. 7, lines 22-29) in the form of an amplitude difference (col. 6, lines 28-35) … to the first audio signal to produce a right first audio signal and a left first audio signal (output of 4-1L,4-1R)(col. 6, lines 11-20);

receiving a second audio signal (e.g., on C_2)(col. 5, lines 48-52);

producing a right second audio signal and a left second audio signal from said second audio signal (output of 4-2L,4-2R)(col. 6, lines 11-20);

providing the right first audio signal and right second audio signal (added by 5R, col. 6, lines 65-67) to a right audio transducer (53R, col. 7, lines 22-42); and

providing the left first audio signal and the left second audio signal (added by 5L, col. 6, lines 61-64) to a left audio transducer (53R, col. 7, lines 22-42);

wherein said first differentiation cue provides differentiation to allow a listener to more easily distinguish said first and second audio signals than without said differentiation cue (col. 1, lines 26-42, col. 7, lines 14-22).

However, Kinoshita does not specify:

- an amplitude difference of at least 3 db

Techniques discloses that interaural level difference (ILD) is one mechanism of the auditory system used for localizing sound along

an intracranial axis. Techniques particularly discloses that the effective range of ILD is around 10 db, at which point the sound effectively stops moving and remains at the leading or more intense ear (page 3). Figure 1 illustrates the results of a testing situation, wherein the judgment of lateral displacement is compared to a range of ILDs that extend to approximately ± 12 dB (page 4). The use of an ILD of the higher absolute value, such as approximately 10 dB, reads on "at least 3 dB".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to apply an ILD at the higher end of the acceptable range, such as approximately 10 dB as taught by Techniques for the ILD of Kinoshita. The motivation behind such a modification would have been that such an ILD would have placed the sound image at the more extreme ends of the possible range of apparent lateral displacement.

Regarding **Claim 2**, Kinoshita in view of Techniques discloses:

the first audio signal is a continuous broadcast (col. 9, lines 27-33 of Kinoshita)

Regarding **Claim 6**, please refer above to the rejection of the similar limitations of Claim 1, noting that Kinoshita discloses that distinct 'target' directionality may be applied through the use of a level difference applied to each of the input channels, which reads on "wherein said cue is added independent of any positional information corresponding to said audio signals" and "the first directionality cue

comprises channel separation between the right first audio signal and the left first audio signal" (col. 7, lines 22-44).

Regarding **Claim 7**, please refer above to the rejection of the similar limitations of Claim 1, noting the components that perform the detailed functions.

More specifically, Kinoshita in view of Techniques teaches:

a first audio input configured to receive a first monaural audio signal (e.g., C_1 from (MC) of (TM-1), col. 5, lines 29-32 and col. 7, lines 5-19 of Kinoshita);

a second audio input configured to receive a second monaural audio signal (e.g., C_2 from (MC) of (TM-2), col. 5, lines 29-32 and col. 7, lines 5-19 of Kinoshita);

a first differentiation block (e.g., 3-1, 4-1L & 4-1R collectively, col. 7, lines 22-34 of Kinoshita)

a second differentiation block (e.g., 3-2, 4-2L & 4-2R collectively, col. 7, lines 22-34 of Kinoshita)

a first channel summer (5L; col. 6, lines 61-64 of Kinoshita)

a second channel summer (5R; col. 6, lines 65-67 of Kinoshita)

Regarding **Claim 8**, please refer above to the rejection of the similar limitations of Claim 1, noting that Kinoshita discloses the application of control parameters to each input signal (col. 7, lines 14-44), Techniques discloses a range of ILD associated with different spatial locations that includes a plurality of those of at least 3 dB (page 4), and Kinoshita provides microphones (MC) as input components (col. 7, lines 5-7).

Regarding **Claim 9**, please refer above to the rejection of the similar limitations of Claims 7 and 8, noting that Kinoshita discloses that the input communication channels may be radio channels, the inherent reception components of which read on "the first monaural signal is provided from a radio receiver" (col. 8, lines 39-44).

Regarding **Claim 14**, please refer above to the rejection of the similar limitations of Claims 1, 2 and 7, noting that stereo loudspeakers (53L,53R) provide the output in the system of Kinoshita (col. 7, lines 34-36) and the simultaneous input illustrated in Figure 12.

Regarding **Claim 15**, please refer above to the rejection of the similar limitations of Claims 1, 2, and 9, noting that demodulation is an inherent function required to produce, from a radio channel, the audio signal to which Kinoshita applies the image control parameter.

Regarding **Claim 23**, please refer above to the rejection of the similar limitations of Claims 7 and 9.

8. **Claims 3, 12, and 13** are rejected under 35 U.S.C. as being unpatentable over Kinoshita in view of Techniques as applied above, and in further view of Slater (USPN 4941187).

As detailed above, Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various input audio channels are controlled in regards to their perceived spatial position. Techniques discloses that interaural level

difference (ILD) is one mechanism of the auditory system used for localizing sound along an intracranial axis.

Kiroshita in view of Techniques does not specify:

- that the continuous broadcast is a weather report broadcast

However, certain applications, such as an airplane audio system, are known to involve a variety of audio signals. Slater discloses an intercom system for an aircraft that combines various input signals, which are then applied over sets of headphones. Communications and navigation equipment are included in this intercom system as sources of audio (col. 1, lines 15-22; col. 9, lines 13-48). One form of communication signal, useful during instrument flight, is given by Slater as "flight watch" (col. 4, lines 1-5). Flight watch is a channel known in the art to provide aircraft with communications regarding a flight conditions such as inclement weather. Accordingly, the input of such a channel reads on "a weather report broadcast".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to incorporate the channel inputs of Slater into the system of Kinoshita in view of Techniques, thereby effectively implementing the spatialization system of Kinoshita in an aircraft environment. The motivation behind such a modification would have been that such an arrangement would have provided spatial differentiation between the intracabin intercom inputs, air-to-ground communications, and auxiliary music sources that correspond to such an environment. As disclosed by Slater, such signals have various priorities and desired levels of intelligibility, which would have

been addressed and improved by an arrangement such as that of Kinoshita in view of Techniques through spatialization of the inputs.

Regarding **Claim 12**, please refer to the above rejection of the similar limitations of Claims 7 and 9, rejected above in view of Kinoshita and Techniques. Kinoshita discloses the implementation of an ILD, but not a component for effecting such a level differences (col. 6, lines 29-36). However, a variety of level affecting circuits are well known in the art. Slater discloses the use of a resistive voltage divider for controlling sensitivity of a VOX circuit (col. 7, lines 32-40). The implementation of such a component to affect the level of the signal lines in the system of Kinoshita reads on "a resistive voltage divider provides a first fixed differentiation cue". Motivation behind such an implementation would have been the minimal number of components required to effect such a level control, as well as the basic manner of making the level adjustable, which is demonstrated by Slater as applying a reference voltage to the passive divider through a potentiometer (Figure 6).

Regarding **Claim 13**, please refer to the above rejection of the similar limitations of Claims 7 and 12.

9. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita in view of Techniques as applied above, and in further view of Lanciaux (USPN 5905464).

As detailed above, Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various

input audio channels are controlled in regards to their perceived spatial position. Techniques discloses that interaural level difference (ILD) is one mechanism of the auditory system used for localizing sound along an intracranial axis.

Specifically regarding Claim 16, please refer above to the rejection of Claims 1, 2, and 14 in regards to the limitations of "receiving", "demodulating", "adding", and "coupling".

Kiroshita in view of Techniques does not specify:

- that the differentiation cue is determined according to a position of a transmitter, the position of the transmitter being determined by a locator

Lanciaux teaches a personal direction finding apparatus for locating a sound source and representing the emitted sound from the source in a virtual location to a user that corresponds to the direction of the source. Lanciaux discloses that direction finding is utilized in various aviation related activities (col. 1, lines 17-21; col. 2, lines 26-43).

Specifically regarding Claim 16, Lanciaux specifies:

wherein the differentiation cue (applied by (6)) is determined according to a position of a transmitter (S), the position of the transmitter (S) being determined by a locator (5) (col. 4, lines 41-62).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to employ the direction finding components of the system of Lanciaux to provide the parameters of the

image control system of Kinoshita in view of Techniques. The motivation behind such a modification would have been that such circuitry would have enabled correspondence between virtual and actual sound source locations in situations, such as aviation, where a physical correspondence exists. Such a modification would have provided particular benefit in situations where the physical correspondence would have potentially enabled the source to be seen.

10. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita as applied to Claims 10-11 and 24-26 above, and in further view of Lanciaux.

Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various input audio channels are controlled in regards to their perceived spatial position.

Regarding Claim 17, Kinoshita specifies:

A method for identifying a radio signal (col. 8, lines 35-41), the method comprising:

receiving a radio broadcast (e.g. on C_1)(col. 5, lines 46-52 and col. 8, lines 35-41);

demodulating (inherent for deriving audible signal from radio signal) the radio broadcast to produce a monaural audio signal (e.g., C_1 from (MC) of (TM-1), col. 5, lines 29-32 and col. 7, lines 5-19)

adding a first differentiation cue (col. 6, lines 21-56; col. 7, lines 22-29) to the monaural signal to produce a left signal and a right signal (output of 4-1L,4-1R)(col. 6, lines 11-20);

coupling the left signal and the right signal to a stereo transducer (53L,54R) so that a listener perceiving an output of the stereo transducer perceives the audio signal as coming from a unique position in psycho-acoustic space and thereby identifies the radio channel according to its perceived position (col. 7, lines 14-34; col. 15, lines 6-25);

Kinoshita discloses that video related controls may be applied to the image control system (col. 8, lines 28-30; col. 9, lines 44-61);

Kinoshita does not clearly specify:

- that the differentiation cue is determined according to a position of a transmitter, the position of the transmitter being determined by a locator;

Lanciaux teaches a personal direction finding apparatus for locating a sound source and representing the emitted sound from the source in a virtual location to a user that corresponds to the direction of the source. Lanciaux discloses that direction finding is utilized in various aviation related activities (col. 1, lines 17-21; col. 2, lines 26-43).

Specifically regarding Claim 17, Lanciaux specifies:

wherein the differentiation cue (applied by (6)) is determined according to a position of a transmitter (S), the position of the transmitter (S) being determined by a locator (5) (col. 4, lines 41-62).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to employ the direction finding

components of the system of Lanciaux to provide the parameters of the image control system of Kinoshita in view of Techniques. The motivation behind such a modification would have been that such circuitry would have enabled correspondence between virtual and actual sound source locations in situations, such as aviation, where a physical correspondence exists. Such a modification would have provided particular benefit in situations where the physical correspondence would have potentially enabled the source to be seen.

Kinoshita in view of Lanciaux does not clearly specify:

a step of displaying a representation of the position of the transmitter on a display of the locator.

However, the examiner takes Official Notice that visual indication means regarding a source direction are well-known in the art. The references applied above provide support for the existence as well as desirability of such indication means. As cited above, Kinoshita discloses a connection between video and the supplied virtual audio. The inclusion of such video signal, along with the general context provided by Kinoshita, imply that the participants or sound sources might not otherwise be seen. Lanciaux discloses that automatic direction finding is used in aircraft or watercraft, and is presented in the form of a bearing or deviation indication. The function of such indication means is considered herein to read on "a step of displaying a representation of the position of the transmitter on a display of the locator".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include a visual display means bearing the indication of a received sound source to the system of Kinoshita in view of Lanciaux. The motivation behind such a modification would have been that such an indication would have provided visual indication to a user in the situation where a physical relationship between a user is both important and exists, such as in aircraft or watercraft navigation, but the source location is not visible to a user. Such situations include vehicle operation in fog or other weather that inhibits visibility, as well as distances between the user and source that prevent visibility. It is particularly observed that Lanciaux teaches away from "requiring the reading of an instrument" (col. 1, line 55), however, such a concept is distinct from the actual inclusion of such a visual instrument, as proposed in the above modification for the conditions disclosed above. The teachings of Lanciaux are presented as applicable to conditions "with a view to determining the direction of a source of radiation" (col. 2, lines 23-26). The modification proposed above would have enabled the overall system to operate in the context of a view not being available, but a spatial relationship being still existent and useful for a user.

11. **Claims 18-22** are rejected under 35 U.S.C. as being unpatentable over Kinoshita as applied above to Claims 24-26, and in further view of Slater (USPN 4941187) and Elko (USPN 6041127).

Kinoshita discloses an audio communication control unit, wherein the properties of the sound images of various input audio channels are controlled in regards to their perceived spatial position.

Regarding Claim 18, Kinoshita specifies:

a first differentiation block (3-1, 4-1L,4-1R collectively; col. 6, lines 8-20) for adding a first differentiation cue (col. 6, lines 21-56 and col. 7, lines 29-34) to said front microphone signal (e.g., via C_1, signal taught below in reference to Elko) to provide a front right channel signal (output of 4-1R) and a front left channel signal (output of 4-1L)(col. 6, lines 61-67);

a right summer (5R) for receiving said front right channel signal (col. 6, lines 65-67) (output of 4-1R);

a left summer (5L) for receiving said front left channel signal (col. 6, lines 61-64) (output of 4-1L);

a third differentiation block (3-3, 4-3L,4-3R collectively; col. 6, lines 8-20) for adding a third differentiation cue (col. 6, lines 21-56 and col. 7, lines 29-34) to said annunciator signal (e.g., via C_3, signal taught below by Slater) to provide a differentiated signal to said right summer (5R) and said left summer(5L);

a fourth differentiation block (3-4, 4-4L,4-4R collectively; col. 6, lines 8-20) for adding a fourth differentiation cue (col. 6, lines 21-56 and col. 7, lines 29-34) to a first communication input signal (Com1)(e.g., via C_4, signal taught below by Slater) to provide a differentiated signal to said right summer (5R) and said left summer (5L);

a fifth differentiation block (3-N, 4-NL, 4-NR collectively; col. 6, lines 8-20) for adding a fifth differentiation cue (col. 6, lines 21-56 and col. 7, lines 29-34) to a second communication input signal (Com2) (e.g., via C_N, as taught below by Slater) to provide a differentiated signal to said right summer (5R) and said left summer (5L);

a left output channel (output of 5L, applied to 6L, Figure 6) for providing a summed output signal from said left summer(5L);

a right output channel (output of 5R, applied to 6R, Figure 6) for providing a summed output signal from said right summer(5R),

wherein, said differentiation cues differ from one another to create an impression that sounds associated with each of said differentiation cues originates from a unique psycho-acoustic location (col. 16, lines 7-29).

Kinoshita does not clearly specify:

a front microphone signal;

at least one of a plurality of navigation and/or annunciator inputs for providing an annunciator signal;

a first communication input signal (Com1)

a second communication input signal (Com2)

However, certain applications, such as an airplane audio system, are known to involve a variety of audio signals. Slater discloses an intercom system for an aircraft.

Particularly regarding Claim 18, Slater discloses:

a front microphone signal (through jacks 14, col. 5, lines 19-21);

at least one of a plurality of navigation and/or annunciator inputs (via 104) for providing an annunciator signal ("aircraft receive audio" as part of "navigation equipment"; col. 1, lines 19-20; col. 8, lines 46-57; col. 9, lines 40-66);

a first communication input signal (Com1) (via 104, as part of "communications equipment", "selected radio frequencies", specific examples of which are given as "ATC, flight watch, and unicom"; col. 1, lines 19-20; col.4, lines 1-5; col. 8, lines 46-57; col. 9, lines 36-66)

a second communication input signal (Com2) (via 104, as part of "communications equipment", "selected radio frequencies", specific examples of which are given as "ATC, flight watch, and unicom"; col. 1, lines 19-20; col.4, lines 1-5; col. 8, lines 46-57; col. 9, lines 36-66)

Slater also discloses that passengers are provided with microphone connections through a rear panel (col. 5, lines 21-24).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to provide the communication inputs of Slater as inputs to the system of Kinoshita, thereby effectively implementing the spatialization system of Kinoshita in an aircraft environment. The motivation behind such a modification would have been that such an arrangement would have provided spatial

differentiation between the intracabin intercom inputs, air-to-ground communications, and auxiliary music sources.

Kinoshita in view of Slater does not disclose:

- a plurality of front microphone inputs, including a first microphone input and a second microphone input for producing a front microphone signal;

However, direction microphones utilizing the inputs of multiple microphones are known in the art. Elko discloses an adaptive microphone array that enables the received sound field to be adjusted, thereby improving the signal-to-noise ratio of an input signal.

Regarding Claim 18, Elko particularly discloses:

a plurality of front microphone inputs (electrical connections to 1,3)(col. 5, lines 9-15; col. 6, lines 58-67; col. 7, lines 1-10);

including a first microphone input (from 1) and a second microphone input (from 3) for producing a front microphone signal (forward cardioid, output of 7) (col. 5, lines 9-12);

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to implement the dual input microphone system of Elko for the various pilot and cabin microphones in the combined system of Kinoshita in view of Slater. The motivation behind such a modification would have been that such input microphone arrangements would have enabled noise to be directionally excluded

from the input provided to the intercom and communication system of Kinoshita in view of Slater. Slater provides an approach to decreasing noise; the at least two microphone input shaping of Elko would have provided an additional manner for handling and preventing such noise. Such cardioid patterns are known in the art for, by definition, having a decreased sensitivity in an input direction, a direction which is disclosed by Elko as being that of a noise source.

Regarding **Claim 19**, Kinoshita in view of Slater and Elko specify:

a summer (7 of Elko) summing said first (from 1) and said second microphone (from 3) inputs to produce said front microphone signal (front cardioid)(Figure 5, Elko; col. 6, lines 58-66).

Regarding **Claim 20**, Kinoshita in view of Slater and Elko specify:

a plurality of back inputs (col. 5, lines 21-24 of Slater; col. 5, lines 9-15; col. 6, lines 58-67; col. 7, lines 1-10 of Elko);

including a third microphone input (e.g., from 1 of Elko of a rear passenger microphone of Slater) and a second microphone input (e.g., from 3 of Elko in the rear passenger microphone of Slater) for producing a back microphone signal (forward cardioid, output of 7 of Elko) (col. 5, lines 9-12 of Elko);

a differentiation block (3-2, 4-2L,4-2R collectively; col. 6, lines 8-20 of Kinoshita) for adding a second differentiation cue (col. 6, lines 21-56 and col. 7, lines 29-34) to said back microphone signal (e.g., via C_2, for rear microphone signal as taught by Slater)

to provide a back right channel signal (output from 4-2R of Kinoshita) to said right summer (5R of Kinoshita) and a back left

channel signal (from 4-2L of Kinoshita) to said left summer (5L of Kinoshita);

Regarding **Claim 21**, please refer above to the similar limitation of Claim 19, noting again that Slater discloses a rear passenger microphone.

Regarding **Claim 22**, Kinoshita in view of Slater and Elko specify:

an input for an automatically mutable stereo entertainment system (col. 8, lines 63-68; col. 9, lines 1-12 of Slater) for providing a first input (such as to 34a of Slater) to said left summer (34a of Slater) and a second input (such as to 34b of Slater) to said right summer(34b of Slater).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham whose telephone number is 703-308-6729. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Examiner
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November 15, 2004

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PRIMARY EXAMINER